

# **Propagation Models Database**

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# PROPAGATION MODELS DATABASE



- A database of various propagation phenomena models which can be used by the telecommunications systems engineers to obtain the desired parameter values for systems design.
- Propagation research
  - Ease of using the models
  - Passing the experimental data through the models
  - Comparison and checking of experimental data.
- An easy to use convenient tool, implemented on a PC to analyze the user propagation data.

# PROPAGATION MODELS DATABASE

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- **Salient features of the software:**
  - **Microsoft Excel 5.0-based software, utilizing Excel's excellent spreadsheet features and charting functions.**
  - **Every model is written as Excel subroutine / Excel User-Defined Function.**
  - **The program produces output for the user in its own spreadsheet or the user may use the subroutines / functions in their own Excel program and transport the result to their program.**
  - **Every care is taken to avoid user-made errors in running the program models.**

# PROPAGATION MODELS DATABASE

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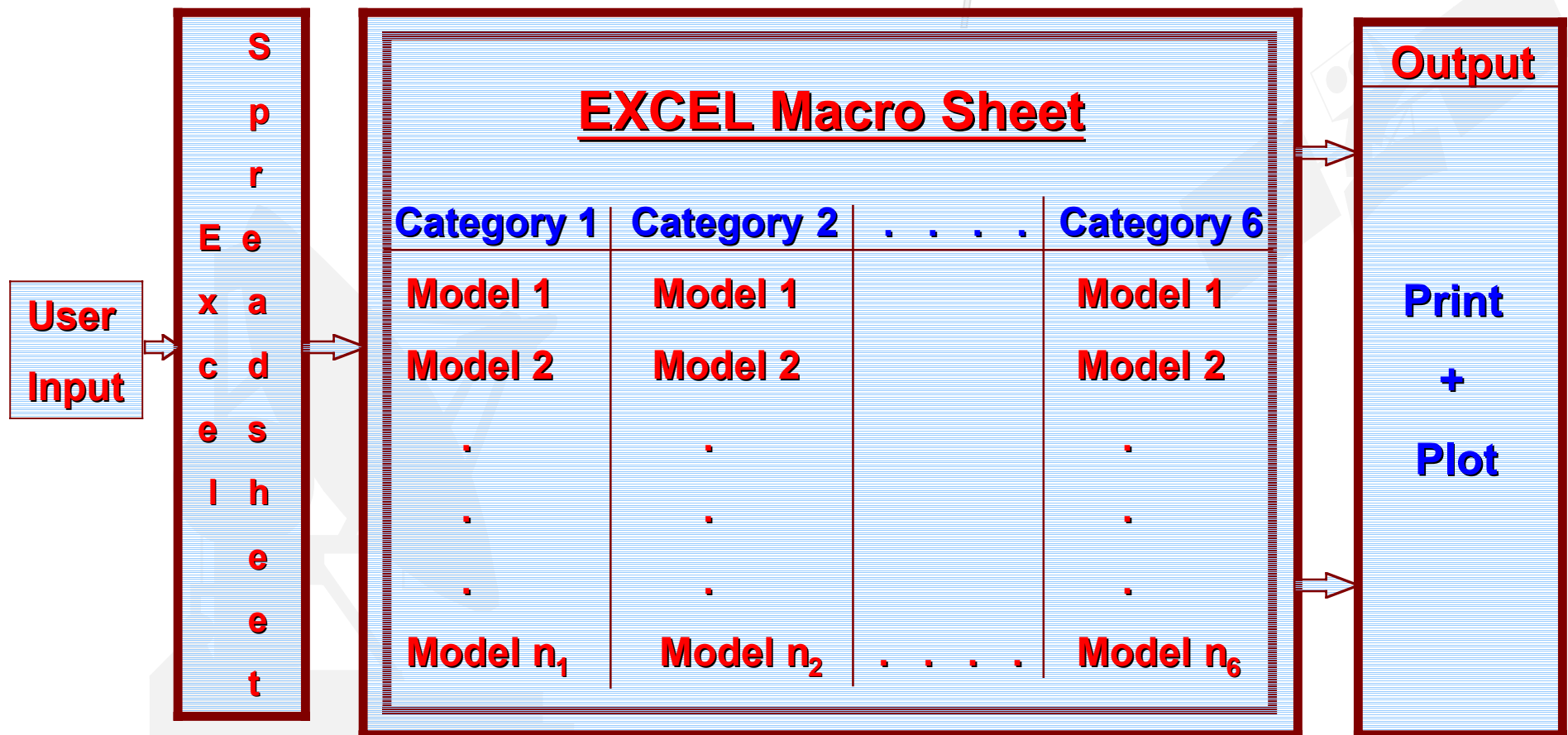
- Every model of the database has the same overall instructions set and same operating procedure, making the user capable of using any model once the procedure is learned.
- Extensive charting procedures are available to the user and, where feasible, the charting procedures and workings are made transparent to the user. The program allows the user to vary any desired variable of the model and see its effects on the user-selected output variable via a chart. The user is allowed to loop back to obtain other combinations of outputs and independent variables without running the model again.
- Every chart produced may be saved or printed out.

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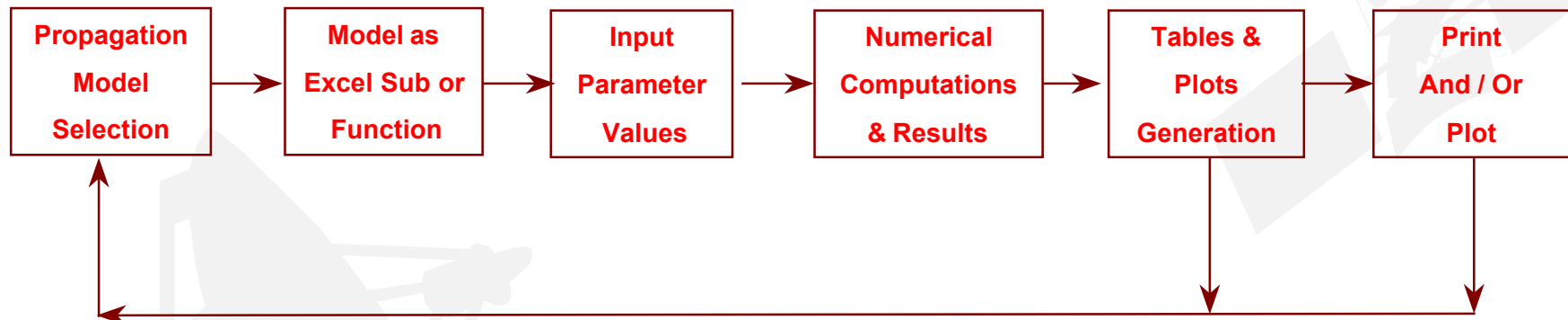


- The database is divided into six major categories
  - Ionospheric propagation models.
  - Tropospheric propagation models.
  - Land-Mobile system propagation models.
  - Effects of small particles on propagation.
  - Rain models.
  - Radio noise models.

# PROPAGATION MODELS DATABASE



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- **System Requirement:**
  - **Windows NT or Windows 95**
  - **At least 8 to 16 Mbytes of RAM**
  - **2 Mbytes of disk space.**
  - **486 or Pentium processor with at least 25 MHz clock rate.**



# PROPAGATION MODELS DATABASE



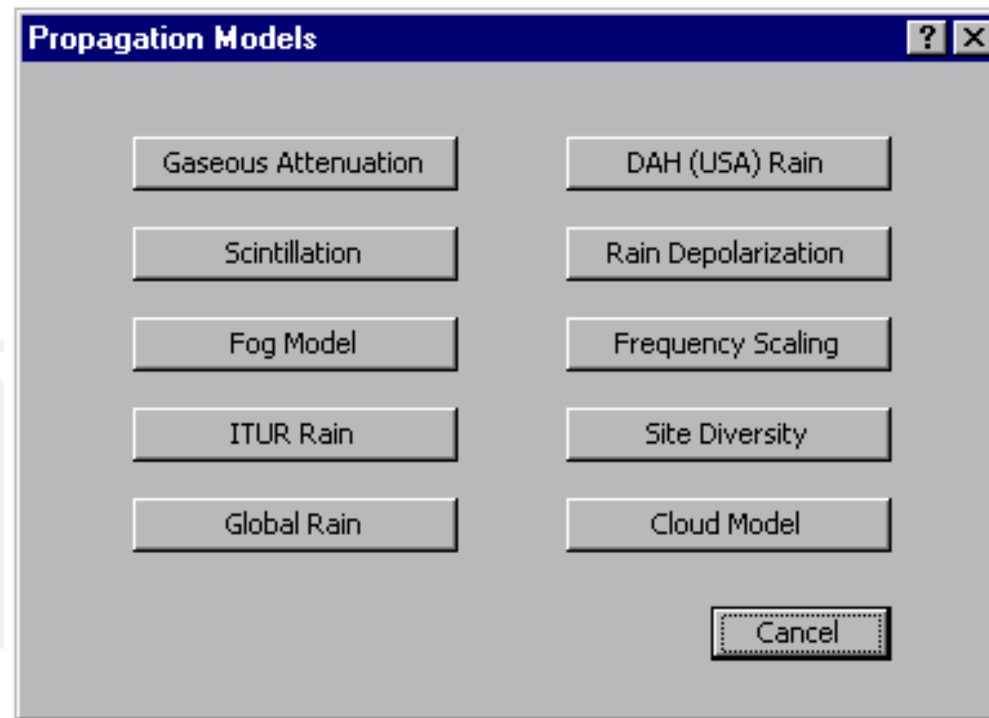
- **Properties of the current version.**
  - **Enhanced graphics.**
    - **Allows the user to produce many different types of graphs from the same vectors.**
  - **New propagation models added.**
  - **Enhanced a few existing models.**

# PROPAGATION MODELS DATABASE

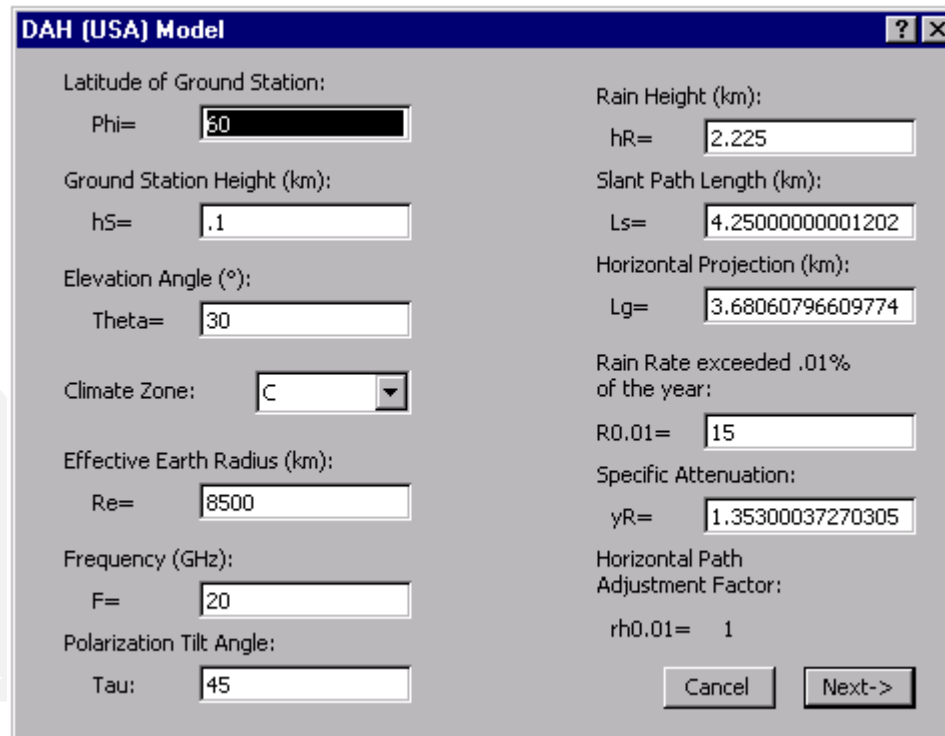
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- **Conversion of the Propagation Models Database from Excel environment to C++ environment.**
- **Design Concepts**
  - **Isolation of:**
    - **User Interface**
    - **Databases**
    - **Computational Engine.**
  - **Make the Propagation Database software more compatible with other software the user may have.**
  - **Make the Propagation Database software independently accessible from a server by remote users.**
  - **Make the Propagation Database software platform independent.**

# PROPAGATION MODELS DATABASE



# PROPAGATION MODELS DATABASE



A screenshot of a software dialog box titled "DAH (USA) Model". The dialog box contains two columns of input fields for various parameters. The left column includes fields for Latitude of Ground Station (Phi=60), Ground Station Height (hS=.1), Elevation Angle (Theta=30), Climate Zone (C), Effective Earth Radius (Re=8500), Frequency (F=20), and Polarization Tilt Angle (Tau=45). The right column includes fields for Rain Height (hR=2.225), Slant Path Length (Ls=4.25000000001202), Horizontal Projection (Lg=3.68060796609774), Rain Rate exceeded .01% of the year (R0.01=15), Specific Attenuation (yR=1.35300037270305), and Horizontal Path Adjustment Factor (rh0.01=1). At the bottom right are "Cancel" and "Next->" buttons.

Parameter	Value
Latitude of Ground Station: Phi=	60
Ground Station Height (km): hS=	.1
Elevation Angle (°): Theta=	30
Climate Zone:	C
Effective Earth Radius (km): Re=	8500
Frequency (GHz): F=	20
Polarization Tilt Angle: Tau=	45
Rain Height (km): hR=	2.225
Slant Path Length (km): Ls=	4.25000000001202
Horizontal Projection (km): Lg=	3.68060796609774
Rain Rate exceeded .01% of the year: R0.01=	15
Specific Attenuation: yR=	1.35300037270305
Horizontal Path Adjustment Factor: rh0.01=	1

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**DAH Dialog 2** [?] [X]

P(%)=

Adjusted Rain Path Length (km):  
Lr= 4.25000000000120

Rv0.01:  
rv001= 1.2296909368895

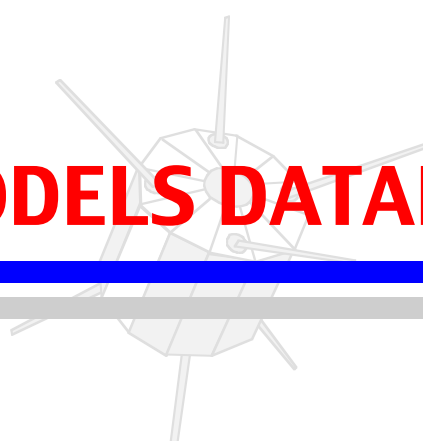
Effective path length through rain:  
Le= 5.2261864817954

Attenuation exceeded for .01% of an average year:  
A0.01= 7.0710322576849

Attenuation exceeded for p% of an average year (dB):  
Ap= 1.5167877118678

<-Prev OK Graph

# PROPAGATION MODELS DATABASE

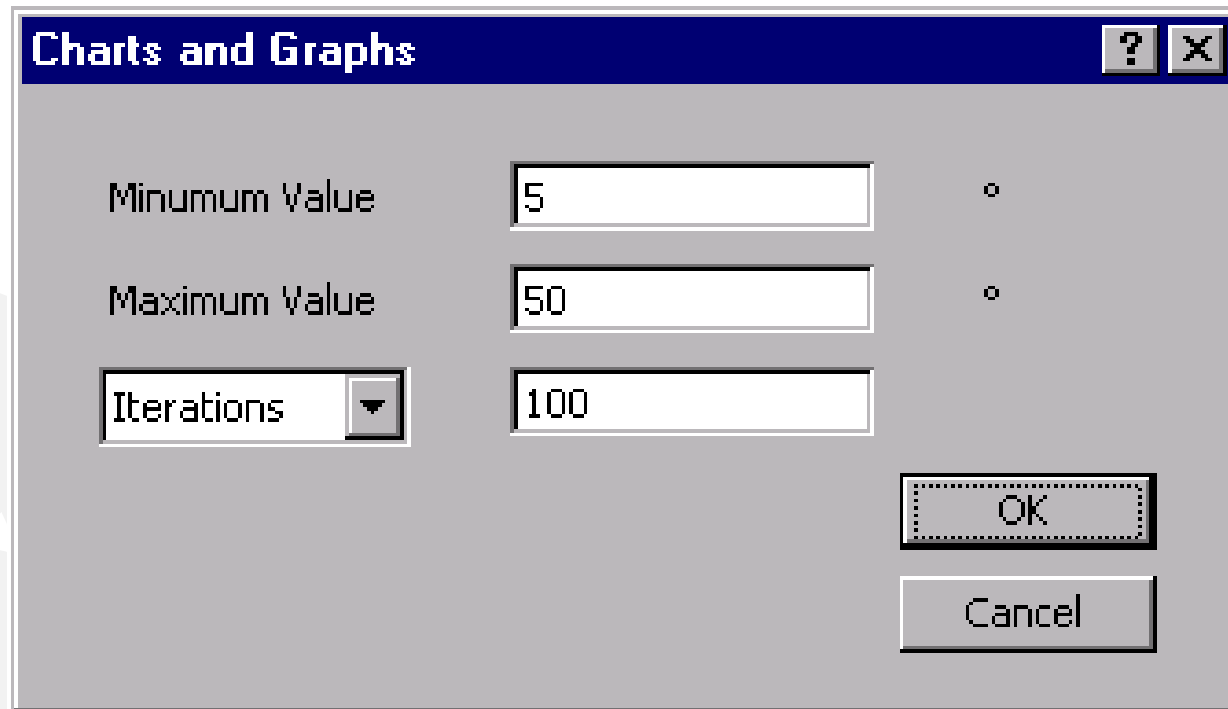


**Charts and Graphs** [?] [X]

Independent Variables	Dependant Variable
Primary: Ground Station Latitude	Rain Height Slant Path Length Horizontal Projection Specific Attenuation Horz. Path Adj. Factor Adj. Rain Path Length Rv0.01 Effective Path Through Rain Atten for 0.01% of Year Atten for P % of Year
Secondary: None	

[OK] [Cancel]

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**Charts and Graphs** ? X

Minimum Value 5

Maximum Value 50

Iterations [v] 100

OK

Cancel

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